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UNIDO POLICIES: TRANSFER OF TECHNOLOGY

Long-term arrangements for the establishment of an International Centre for Science and High Technology

Report by the Director-General

Summary

Reviews the progress made in and considerations related to the establishment of an International Centre for Science and High Technology and presents the long-term arrangements for the implementation of the activity based on voluntary contributions to UNIDO.

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Introduction

1. In 1988, a proposal by Professor Abdus Salam (Pakistan), Nobel Laureate and President of the Third World Academy of Sciences, to establish an international centre for science and high technology (ICS) at Trieste, Italy, was welcomed and supported by the Italian Government. To this end, a project for the preparatory phase for the establishment of the ICS was entrusted to UNIDO for execution in 1990, with funds provided by Italy under their special-purpose contribution to the Industrial Development Fund (Annual Report, IDB.5/10, chap. III, para. 20). In May 1989, an additional and complementary project for pilot activities for the ICS for $10 million was approved, with funding by Italy in instalments through its special-purpose contribution to the Industrial Development Fund, within this overall figure (Annual Report, IDB.6/10, chap. III, para. 22). These UNIDO Annual Reports and earlier reports to the Industrial Development Board on development and transfer of technology have given accounts of the progress of this UNIDO activity.

2. The concept of an international centre for science and high technology is based on the realization that the frontiers of science are advancing and high technology is increasingly science-based. Chemical and materials sciences are marked by rapid scientific advances and quick commercialization and have a crucial role to play in the patterns of industrialization currently, and more so in the years to come. Materials engineering, an important tool for industrialization and development, is critically dependent on research on physical and chemical properties of materials. Earth and environment sciences are increasingly having a bearing on industrialization, on the one hand in relation to conservation of the land resources, and on the other hand with the exploitation of ocean resources. Thus, a constellation of scientific advances governs the direction of industrialization and development and the mastery of the technology required therefor. The developing countries' industrial and technological capabilities cannot be soundly built up without an adequate scientific base in pure and applied research.

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3. The proposal of Professor Salam was to establish three international institutes within the ICS, namely the international institute for pure and applied chemistry, the international institute for earth, environmental and marine sciences and technologies, and the international institute for high technology and new materials. The design of the ICS and its operation have been conceived in an integrated fashion, allowing scientific programmes to benefit from inputs from various scientific disciplines, promoting cross-fertilization and interdisciplinarity.

I. PREPARATORY PHASE

4. In the early preparatory phase of the project, intensive discussions were carried out, involving over a hundred leading scientists and technologists from both Italy and abroad (mainly developing countries). Two formal meetings were organized in 1988 for each of the proposed institutes. In addition, several informal steering committee meetings were held for each institute. Additional inputs for programme development were obtained from the Third World Academy of Science (TWAS), which has been cooperating closely in the project. The inputs obtained from the various meetings etc. were used in preparing an interim report on the ICS project, which was completed at the end of 1988. This interim report was reviewed by an independent high-level advisory panel, which included three Nobel Laureates. This advisory panel, after reviewing the interim report, gave its full support to the project. The main results of the review were:

(i) Full support for the ICS initiative which corresponds to the needs and expectations of the scientific community of developing countries and which could make a valuable contribution to the industrial and general development prospects of those countries;

(ii) Very broad agreement with the approach envisaged for the achievement of goals set by the ICS project; and, specifically

(iii) Unanimous encouragement to start, as soon as possible, pilot activities as an indispensable tool for definition of long-term programmes and for providing a basis for the establishment and operation of the ICS.

II. PILOT ACTIVITIES

5. From the outset of the project, it has been considered essential that basic scientific research activities and training should start in parallel with the process of definition and planning for the ICS. This approach seeks to maintain the momentum acquired by the project within the international scientific community as well as providing more precision for the definition of scientific activities in the longer term. A number of the research lines were started, scientific staff recruited and initial work undertaken on the creation of a network of scientific institutions in developing countries. Also, considerable scientific equipment was installed and a comprehensive computer network put in place. During 1990, 16 training courses, covering a wide range of scientific and technological subjects, were held within the framework of the ICS and were attended by 1,128 participants. For 1991, 31 conferences, workshops and training courses have been planned, several of them to be carried out in cooperation with other institutions, particularly the International Centre for Theoretical Physics (ICTP). An international course for research management is also scheduled for September 1991. Two of the training courses are to be held in Venezuela and Pakistan respectively and one conference will be held in China.

6. Coordination has been maintained with various scientific institutions, and within the United Nations system. Specifically, the ICS project and its progress has been reported to the Administrative Committee on Co-ordination (ACC) Task Force on Science and Technology for Development at its 11th session and to the Intergovernmental Committee on Science and Technology for Development in General Assembly document A/CN.11/1991/5.

III. ESTABLISHMENT OF THE CENTRE

7. The preparatory and pilot activities have confirmed the essential role that ICS can play in international cooperation in science-based high technology and the need for the continued involvement of UNIDO in its establishment and operation. To attract high-level scientists necessary for the creation of institutions of excellence, and to have an adequate impact on industrial and technological development, it is considered essential for the ICS to have long-term character. Many of the research lines take several years to establish and the availability of leading scientists for both research and training has to be assured well in advance with a contract period of sufficient duration to provide them with the necessary stability.

8. In the light of the foregoing, it is opportune to consider the long-term arrangements for the ICS. International centres of excellence are effective mechanisms of international cooperation for helping developing countries in long-term capability building in selected scientific and technological areas. Without such a capability, which will have to be built necessarily over a period of years, developing countries will not be in a position to avail themselves of new industrial technologies and products. This is of special importance for the smaller developing countries which do not have the financial and human resources for research and development in sufficient quality and magnitude. Several international centres of excellence with different juridical status have been assisted by the World Bank and the United Nations Development Programme through the Consultative Group for International Agricultural Research. Other examples include the International Centre for Insect Physiology and Ecology, the centres established by the United Nations University and the International Centre for Genetic Engineering and Biotechnology promoted by UNIDO. The UNIDO programme on development and transfer of technology as delineated in document IDB.3/26, endorsed by the Board and the General Conference, recognizes the importance of mobilizing international scientific and technological cooperation including the creation of international mechanisms (IDB.3/26, para. 19 (c)).

9. Though located in an industrialized country, the aim of the ICS is to provide, through participation in research and training, access for developing countries to state-of-the-art equipment and worldwide scientific and technical expertise. Its location at Trieste provides special advantages, as Trieste is also the home of other internationally renowned scientific and technological centres, including the International Centre for Theoretical Physics (ICTP), the International Centre for Genetic Engineering and Biotechnology (ICGEB), the Third World Academy of Sciences (TWAS), which allows interaction and synergy between the various scientific disciplines. The target beneficiaries of the ICS activities are mainly developing-country scientists and technologists. The transfer of scientific and technical knowledge is now seen as essential in ensuring the sustainable development of industry in developing countries. The strategy of the ICS is to further the utilization of applied science and the development of science-based technologies and industries through the transfer of knowledge, and the stimulation of development of research projects in developing countries. The direct relevance of the ICS activities to industrial development was one of the major considerations of the steering committees in proposing research areas. The benefits of the ICS to developing countries are direct and indirect, and through individuals and institutions. These have become evident in the pilot phase. Scientists and technologists from developing countries are able to participate in the ICS for shorter periods through training programmes and for longer periods through associateships. Such participation, inter alia, promotes interaction with and eventual affiliation of scientific and technological institutions in developing countries with the ICS. The existence of the ICS in this way will also provide an important stimulus for the development of complementary activities and institutions at the national level in the developing countries.

10. As stated earlier, the objectives and functions of the ICS were identified through a series of discussions in a number of scientific committees, with the participation of experts from several developing countries. The research lines chosen were a result of such discussions and sought to strike a balance between consolidation of some of the advanced scientific and technological activities earlier carried out ad hoc through the ICTP and taking up new lines of advanced research, which were considered of particular interest to developing countries. The Third World Network of Scientific Organizations, at its ministerial meeting in October 1988, and the South Commission have recognized and underlined the role and benefit of the ICS to the developing countries and welcomed its establishment.

11. The long-term objectives of the ICS follow largely those of the preparatory and pilot phase. Briefly:

- The ICS will aim to stimulate and promote high-level research and development activities in-house as well as in laboratories in developing countries, through training and participation in ICS research activities of scientists from those countries. The establishment of the ICS will provide an institution, to which scientists from developing countries can come to carry out long-term research at an advanced level at the frontiers of science in certain chosen fields. The transfer of scientific knowledge and techniques is of paramount importance, as the advancement thus made in the various disciplines will act as a catalyst for economic development.

- It is anticipated that the ICS will develop into a focal point which will provide, as far as possible, for the needs of scientists from developing countries with regard to literature, state-of-the-art or at least ultra-modern instrumentation, and facilities for the training of scientists and technicians.

12. The programme of the research lines of the three institutes comprising the ICS are: (a) the Institute for Pure and Applied Chemistry to cover macromolecules, catalysis, reactivity, computer chemistry, synthesis, fine pharmaceuticals and interfacial phenomena; (b) the Institute for Earth, Environmental and Marine Sciences and Technologies to cover recent advances in geophysics, prospecting, earthquake prediction and engineering, atmosphere and oceans, environmental aspects of climate, water management, expert systems for monitoring water pollution and marine research, including marine biotechnology and activities connected with mining and offshore engineering; (c) the Institute for High Technology and New Materials to cover computer science and microelectronics, lasers, fibre-optics, communication physics, superconductivity, semiconductors, composite materials and materials for energy conversion. The activities of the ICS are primarily in-house research, conferences, workshops and training courses, with increasing emphasis on cooperation with industry and developing-country institutions. It is estimated that to ensure a critical mass of effort the above programme will require resources of the order of $7 million per annum.

13. The development of international centres as institutions of excellence are very much dependent on the cooperation of the scientific and technological community and donor support. The cooperation of the scientific and technological community depends on factors such as the image of the centre as a long-term and stable venture aiming at excellence, the degree of participation afforded in the formulation of the scientific and technological programmes and the scope for the senior scientists working in the centre to carry out activities by themselves within the framework of overall objectives. Participation of eminent scientists from relevant disciplines from a wide range of countries has to be secured.

14. It is proposed that the ICS will be financed exclusively from voluntary contributions to be made to UNIDO for that purpose. Donor support from developed and developing countries is therefore crucial and in view of the need to elaborate and sustain long-term programmes, donors have to be associated at the stage of programme formulation itself, so that their priorities and the extent of their contributions are well understood. While normally in using the special-purpose contributions to the Industrial Development Fund, consultations with donors need to be undertaken on a project-by-project basis, a modality for closer interaction between the Director-General and prospective donors to the ICS is essential to obviate piecemeal and repetitive consultations.

15. The foregoing considerations have been kept in mind in extensive discussions with the representatives of the Government of Italy who have indicated that the Government of Italy will provide adequate funding for the ICS and that it is its intention to pass a law to provide regular contributions which will invest the ICS with long-term financial stability.

16. Having regard to the constitutional mandate of UNIDO, it is proposed that the appropriate modality of establishing the Centre would be through a decision by the Board to establish it as an autonomous scientific institution within the legal framework of UNIDO. The institutional structure proposed is shown in the annex.

IV. ACTION REQUIRED OF THE BOARD

17. The Industrial Development Board is invited to adopt the following decision:

"The Industrial Development Board:

(a) Takes note of the report of the Director-General on the establishment of an International Centre for Science and High Technology (ID8.8/46);

(b) Approves the establishment of an International Centre for Science and High Technology, financed exclusively by voluntary contributions to UNIDO, as an autonomous scientific institution within the legal framework of UNIDO, and with the institutional structure as stated in the annex to document ID8.8/46;

(c) Requests the Director-General to submit a report to the Board at its ninth session on the progress made in the implementation of the present decision;

(d) Invites the General Conference at its fourth session to take note of the present decision."

Annex

INTERNATIONAL CENTRE FOR SCIENCE AND HIGH TECHNOLOGY - INSTITUTIONAL STRUCTURE

General

1. The ICS will be financed exclusively from voluntary contributions to be made to UNIDO for the purpose of the ICS. No expenditure may be charged to the UNIDO regular budget except to the extent the regular budget is reimbursed for such expenditures. To reimburse the cost of administrative and other support costs by the UNIDO Secretariat, the Director-General shall determine the overhead rate at which expenditures for ICS activities shall be charged. Provision shall also be made for reserves for the liquidation of claims from staff of the ICS and from third parties. In case the United Nations or specialized or related agencies of the United Nations should wish to participate in the activities of the ICS, they would be allowed to do so in accordance with the applicable procedures and as mutually agreed.

2. The Government of Italy and UNIDO shall conclude a comprehensive seat agreement defining the objectives, the financial contributions of the Government of Italy and the legal status of the ICS and providing privileges and immunities, exemptions and benefits at a level comparable to that provided by Italy to other comparable specialized agencies of the United Nations. The comprehensive seat agreement shall also contain a description of the land and buildings which shall be placed at the disposal of UNIDO cost free for the use as premises of the ICS, in accordance with and pursuant to the terms of the agreement. Premises may be provided by the International Centre for Theoretical Physics, the Research Area of Trieste or by other Italian authorities in Trieste or in Venice, or in any other location in which the activities of the ICS will be carried out. The comprehensive seat agreement shall be concluded without delay in order to enable UNIDO to implement the institutional structure set out herein.

Director-General

3. The Director-General of UNIDO shall be the chief administrative officer of the ICS in accordance with Article 11 of the Constitution of UNIDO. In that capacity he shall ensure that the ICS is administered in accordance with the Financial and Staff Regulations and Rules of UNIDO and he may, as necessary, issue special rules and administrative instructions or circulars for the ICS. The Director-General shall appoint the Managing Director and other staff of the ICS in accordance with UNIDO's Staff Regulations and Rules.

Rector of the ICS

4. The Director-General shall nominate a Rector of the ICS, who will supervise all the scientific activities of the ICS and will be responsible for them. The Rector and the Managing Director will prepare the programme and budget of the ICS on the advice of the International Scientific Committee. The Rector will also be the Chairman of the International Scientific Committee. The scientific programmes of the ICS will be subject to his overall guidance. The Rector will be Professor Abdus Salam.

Managing Director of the ICS

5. Subject to the authority of the Director-General of UNIDO as chief administrative officer, the Managing Director shall be responsible for the management and administration of the ICS. He, and the Rector, shall prepare the programme and budget of the ICS on the advice of the International Scientific Committee (referred to below).

International Scientific Committee

6. An International Scientific Committee reflecting the relevant scientific disciplines will be constituted by the Director-General of UNIDO on the proposal of the Rector acting together with the Managing Director. The Director-General of UNIDO or his representative will participate in the work of the International Scientific Committee. The Committee will advise on the scientific aspects of the Centre's work, normally meeting at least once a year. In particular, the Committee shall review the draft programme and budget, drawn up by the Rector and the Managing Director, and make its recommendations thereon to the Director-General of UNIDO.

Steering Committee

7. There will be a Steering Committee composed of representatives of major donors and of the Director-General of UNIDO, which shall review the draft programme and budget taking into account the recommendations of the International Scientific Committee, the amount of resources offered by each donor and the priorities attached by them to the different activities of the ICS. The Steering Committee also may suggest candidates for appointment as Managing Director of ICS. The Rector and the Managing Director, shall submit the programme and budget as agreed to in the Steering Committee to the Director-General of UNIDO for his approval.

8. The secretariat services of the International Scientific Committee and the Steering Committee will be provided by the ICS.

Programme and Budget

9. The Director-General of UNIDO will establish under the Financial Regulations and Rules a special account within the IDF (for special-purpose contributions to the IDF made by the Government of Italy and other donors).

10. The ICS Programme will be for a five-year period and shall be extended biennially following UNIDO's budget cycle which commences each even calendar year. Donor commitments are expected to be made on the basis of such five-year programmes. Payments may be made on a yearly basis.

11. The Director-General of UNIDO, after consultation with the executive heads of such other specialized or related agencies of the United Nations or autonomous organizations within the United Nations, as may be contributing financially to the ICS, and with the Rector and the Managing Director of the ICS, may establish advisory panels of specialized scientists for each of the Institutes that make up the ICS.

12. Should the ICS become a direct part of the United Nations organization, this arrangement will be reviewed.